NAVAL POSTGRADUATE SCHOOL
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THESIS

A REQUIREMENTS SPECIFICATION OF MODIFICATIONS TO THE FUNCTIONAL DESCRIPTION OF THE MISSION SPACE RESOURCE CENTER

by

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June 2001

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Use of the FDMS Resource Center is voluntary on the part of DoD M&S organizations, although maximum use of the Center is paramount if standardization and reuse synergies are to be realized. In an effort to encourage more use of the Resource Center's capabilities, the author analyzed the Resource Center, interviewed the Center's principals, and developed a set of requirements governing screenshot appearance, data workflow control, and privilege permission selections which should simplify and clarify the Center's user processes.

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A REQUIREMENTS SPECIFICATION OF MODIFICATIONS TO THE FUNCTIONAL DESCRIPTION OF THE MISSION SPACE RESOURCE CENTER

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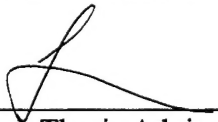
Approved by: 
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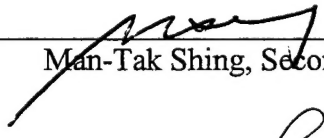
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I. INTRODUCTION

A. BACKGROUND

The Defense Modeling and Simulation Office (DMSO) is a Department of Defense (DoD) agency which serves as a clearinghouse for modeling and simulation policies, guidance, and activities. It acts as the executive secretariat for the Executive Council on Modeling and Simulation and, among other specified duties, assists Department of Defense (DoD) Services and Agencies develop, acquire, and share modeling and simulation (M&S) technology, standards, and processes.

A key document which guides DMSO's activities is DoD 5000.59-P, The DoD Modeling and Simulation Master Plan, dated October 1995. This document provides focus and direction to the entire DoD M&S community. Its six objectives address commonly shared concerns such as a common technical framework, authoritative representations of the natural environment, systems, and human behavior, and M&S education, resource repositories, and accreditation.

DMSO responded to the three sub-objectives of the Modeling and Simulation Master Plan depicted in Table 1 by developing the Functional Description of the Mission Space (FDMS) Resource Center. The Resource Center, at its most basic, is a web-based products repository which allows users to register, control, and manage their digital models and simulations. It provides analysis tools, and can facilitate re-use and interoperability by transforming certain products into XML documents using a standard document type definition (DTD).

Sub-Objective	Description
1-2	Develop conceptual models of the mission space (CMMS) to provide a common starting point for constructing consistent and authoritative M&S representations, and to facilitate interoperability and reuse of simulation components.
1-3	Establish data standards to support common representations of data in models and simulations.
5-3	Provide a repository system to facilitate developer and end-user access to modeling and simulation resources.

Table 1. Selected Sub-Objectives from DoD 5000.59-P

The DoD Modeling and Simulation Master Plan is almost six years old. It is currently being updated and is expected to be approved later this year. The new plan is anticipated to replace the current six main objectives with the five objectives listed in Table 2. The FDMS Resource Center, by design, actively supports the first and fourth objectives.

Objective	Description
1	Promote M&S standardization and reuse
2	Develop authoritative M&S representations
3	Provide and maintain supporting M&S infrastructure
4	Provide ready access to M&S resources
5	Improve the usability of M&S

Table 2. Main Objectives of Draft DoD 5000.59-P

DMSO manages a related but separate cataloging effort called the Modeling and Simulation Resource Repository (MSRR). Whereas the FDMS Resource Center is designed to catalog military models of the mission space, provide analysis capabilities, and promote interoperability and re-use through a standard DTD, the purpose of the MSRR is to catalog, via a distributed system of resource servers, *all* products related to modeling and simulation. These products include, but are not limited to, models, simulations, databases, algorithms, documents, tools, and utilities. DMSO is currently orchestrating an effort to link some of the capabilities of the MSRR with the FDMS Resource Center in order to reduce redundancies and achieve synergy between the two systems. In fact, some of the requirements discussed in Chapter III are currently implemented in the MSRR. If the linkage between the MSRR and the FDMS Resource Center is successful, those requirements will not have to be re-implemented in the FDMS Resource Center.

B. PURPOSE

The FDMS Resource Center is functional and on-line at http://38.241.48.9. It is a tool provided by DMSO for the use of the Services' and Agencies' modeling and simulation organizations. There is no *requirement* that the Services and Agencies use the Resource Center. Therefore, the Resource Center will only provide value to the DoD if the Services and Agencies recognize that value and choose to register their M&S products with the Center and use the analysis and translation tools there.

The FDMS Resource Center Project Manager (PM) recognizes the synergy which could develop if most DoD M&S organizations used the Center. To that end, the PM is concerned that the Resource Center be intuitive and easy to use. The Resource Center

provides users strict control of the products they register, and the PM wants to ensure that the workflow which makes available that strict control to be clear and unambiguous.

The purpose of this thesis is to conduct an analysis of the FDMS Resource Center and, keeping the PM's goals in mind, provide a set of recommendations -- herein called "requirements" -- which will enhance the Resource Center's ease of use and improve users' perceptions of the proven capabilities of the Center.

C. SCOPE AND METHODOLOGY

This thesis concerns itself with the usability of the FDMS Resource Center web-based tool. It does not take into account the kind of data registered or stored in the Resource Center's repositories, nor does it assess the functionality of the Center's analysis tools or XML translation capability.

The author developed the concept for this thesis after an initial interview with the FDMS Resource Center's project manager, Mr. Jack Sheehan. Mr. Sheehan arranged for the author a workspace in the offices of Resource Center's development contractor, Innovative Management Concepts, Inc. (IMC) of Sterling, VA. At IMC he was able to analyze the Resource Center on IMC's development server, read development documents, and confer daily with IMC's project manager and chief programmer/developer. From this vantage point the author was able to study and use the FDMS Resource Center and develop the requirements discussed in Chapter 3.

II. OVERVIEW OF THE FUNCTIONAL DESCRIPTION OF THE MISSION SPACE RESOURCE CENTER

A. DESCRIPTION OF FUNCTIONS

The FDMS Resource Center provides a number of functions to the M&S community, to include search capability of authoritative data sources, guidance on common syntax and semantics, and links to other M&S web sites. The main attraction of the Resource Center, however, is its FDMS Library. The Library consists of two M&S repositories: the Native Library and the Common Library. Each library consists of digital modeling and simulation products of the U.S. military's functional description of the battlespace.

1. Native Library

The FDMS Native Library consists of the M&S files which the user submits to the repository. A Native Library product may be a word processor file describing a real-world process, a set of slides illustrating an IDEF model, or executable code. The digital models and simulations are stored unchanged from their original form; hence, it is the Native Library because the files are maintained in their native format.

This is not to say that the files are fixed in the Library forever. As described below, users have control over the models and simulations they register in the Library. Users can remove from the Library models and simulations they deem obsolete or no longer accurate. Conversely, a user can modify his file and resubmit it so that it replaces the original file or exists with the original file providing a configuration management trail and record.

The Native Library contains search tools to enable the recovery and re-use of existing models and simulations. It also provides controls with which the originating user can regulate the use of his products.

2. Common Library

The FDMS Common Library provides the FDMS with its re-usability and interoperability functions. Some Native Library products can be converted into a "common" product using the FDMS XML Data Interchange Format (DIF) and then stored in the Common Library. Models and simulations in the structured format provided by the FDMS XML DIF can then be more thoroughly analyzed, creditably compared with other documents in the same format, and will more likely interoperate. The likelihood of reuse of developed models and simulations is enhanced as well.

As with the Native Library, users have control over who has access to their M&S products.

B. TYPES OF USERS

The FDMS Resource Center defines four types of users (not including the FDMS Administrator who is not discussed in this thesis) as shown in the Resource Center screen shot in Figure 1. These user types are not mutually exclusive -- every Resource Center user can act as a Producer, Consumer, and Examiner, and a selected few are designated as Sponsors as well.

1. Sponsor

The Sponsor is the kingpin of the FDMS Resource Center. Sponsors are assigned by the Resource Center Administrator after a positive check with the potential Sponsor's organization that the candidate is an M&S principal who requires Sponsor privileges.

Sponsors not only have control of who has access to FDMS products, but they also control who has access to the FDMS libraries. Through the use of privileges, the Sponsor approves who may submit M&S products (called the "Producer") and who may view or use them (called the "Consumer"). He may also assign a user (called the "Examiner") to review or analyze a product.

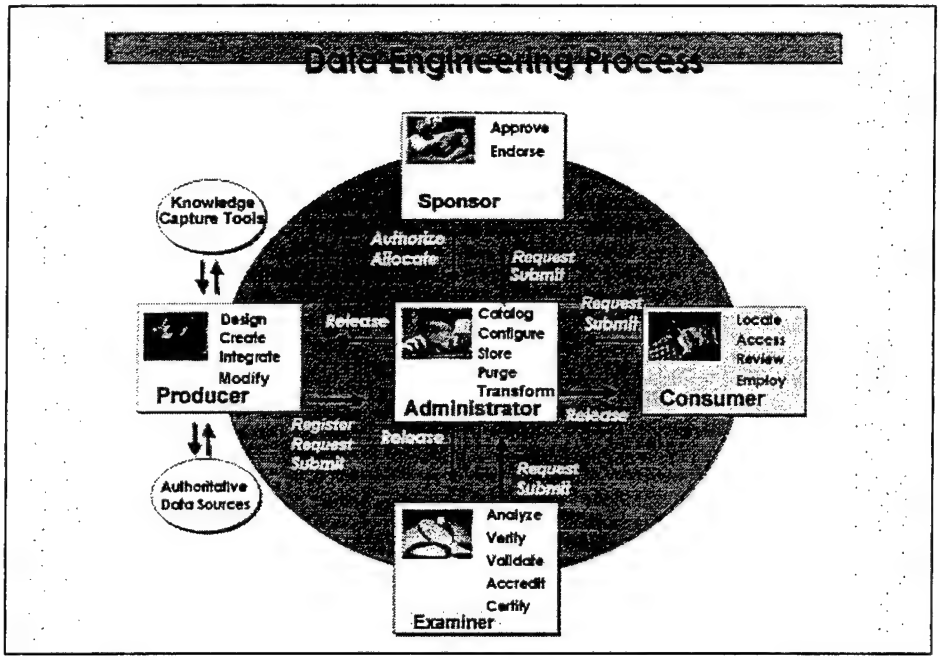

Figure 1. Users of the FDMS Libraries.

2. Producer

The Producer, of course, also has a large role in the FDMS Resource Center -- he submits the products for registration and inclusion in the libraries. The Producer develops the products outside the Resource Center, and his submissions are controlled by a governing Sponsor.

3. Consumer

The Consumer is the actual user of an M&S product registered in the FDMS Resource Center. As stated above, a Consumer can gain access to a product only with the explicit permission of the governing Sponsor.

4. Examiner

The Native and Common Libraries provide the capability for the Sponsor to assign a product to a user for that user to analyze, verify, validate, accredit, or certify. That user, when he gets these missions, is the Examiner. Some tools to assist in these functions are provided in each of the FDMS libraries.

C. USE CASES

A few representative use cases will illustrate the relationship the different users have with each other as well as partially demonstrate the need for the requirements analysis in Chapter III.

1. Register a Product

The first use case describes the process to register a digital product in the FDMS Resource Center.

Use Case: Register a Product

Actors: Producer, Sponsor, Administrator

Purpose: To provide the Resource Center a digital product.

Overview: Producer provides the Resource Center a link to a digital product. Sponsor decides to accept the link, which constitutes registering the product.

Actor Action	System Response
1. Producer browses through available registration elements and selects one.	
2. Producer fills in descriptive information and provides a link to the digital product.	
3. Producer clicks button uploading product.	
	4. Sends message notifying Administrator of Producer's action.
5. Sponsor selects product name and clicks button approving the product.	
	6. Sends message notifying Administrator of Sponsor's action.
7. Administrator selects product name and indicates to the System that selection should be visible.	
	8. Makes product name visible to all users of Sponsor's registration element.

This use case describes the current implementation of process to register products in the FDMS Resource Center. An analysis of the use case reveals some shortcomings.

First, how did the Sponsor know a product was pending his decision? The System notified the Administrator of the Producer's actions, but it did not notify the Sponsor. Second, why did the System not inform the Producer of the Sponsor's decision? An alternative scenario to this use case occurs when the Sponsor disapproves registering the new product. In either case, it is a significant oversight not to notify the Producer of the outcome of his initial action.

2. Authorize Release

This second use case describes the fairly simple process of a Sponsor providing a Consumer access to a Resource Center product.

Use Case: Authorize Release

Actors: Sponsor, Consumer

Purpose: To provide a Consumer access to digital products.

Overview: Sponsor provides access to a product or a registration element (constituting a number of products) to a Consumer or set of Consumers.

Actor Action	System Response
1. Consumer contacts Sponsor and requests Consumer privileges for a Resource Center product.	
2. Sponsor selects product name or registration element (constituting a range of products).	

Actor Action	System Response
3. Sponsor selects Consumer name from a drop-down list and clicks the "Finish" button.	
	4. Makes selected product or registration element visible to Consumer. Notifies Consumer via email message.

This use case is straight-forward and describes a critical process for the Resource Center to provide utility to its users. But consider an alternative scenario in which the Sponsor agrees to provide many Consumers access to a product. Step 3 then becomes: "Sponsor selects each Consumer name one by one from the drop-down list. Once complete, Sponsor clicks the 'Finish' button." This is still a straight-forward process unless the Sponsor has to select dozens of names from the list. It would be an even greater chore if the names were unfamiliar to the Sponsor, e.g., the Consumers are from another organization which has an interest in studying or reusing the Sponsor's products.

The following chapter addresses these and other issues with the FDMS Resource Center. The intent is to enhance the Resource Center's processes so that they will be clear, informative, and useful to the DoD modeling and simulation community.

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III. REQUIREMENTS

A. INTRODUCTION

This chapter defines the new requirements of the FDMS Resource Center. The requirements range from cosmetic changes of existing screens to refinements of current capabilities to definitions of entirely new FDMS processes.

In general, each paragraph of this section describes a need and refers to a figure which illustrates the need. The resulting requirement is labeled with an "R" followed by a hierarchical number (R3, R3.1, R3.1.1, etc.) and separated from the text by a box. All the requirements are summarized at Table 3 at the end of this chapter.

B. GENERAL REQUIREMENTS

The FDMS is inconsistent when referring to the digital files which it catalogs and maintains. At times the files are called "documents", "products", or "resources". The term "document" is ill-chosen because the FDMS libraries can maintain non-documents like models and simulations implemented as executable files or databases. The term "resource" is not concise and connotes a business-like air to the FDMS tool (funds, assets and liabilities, income and expenditures, etc.). The term "product" best captures the useful nature of the digital files maintained and cataloged by FDMS libraries.

R1 The FDMS libraries will refer to the digital files in its repository as "products".

C. PRODUCER FUNCTIONS

Producer Functions are the first of the five sets of user functions. The set of Producer Functions consists of four subordinate functions as depicted in Figure 2.

Figure 2. Producer Functions.

1. Design/Create

The Design and Create Documents function is not automated in FDMS. The screen (Figure 3) clearly states that the user must create documents "external to the Toolset." This information is useful but there are two ambiguities with the screen. First, the use of the term "documents" is misleading but has already been discussed in Paragraph III.A and in Requirement R1. The second issue centers around the terms "register" and "submit". In FDMS, to "register" a product is to initially place it into the repository. Whenever a producer modifies an FDMS product, he has to "submit" the modified product rather than re-register it. This distinction is important to the FDMS community and should be made clear either explicitly on this screen or through a direct link.

R2 The Design and Create Documents screen will clarify the difference between "register" and "submit".

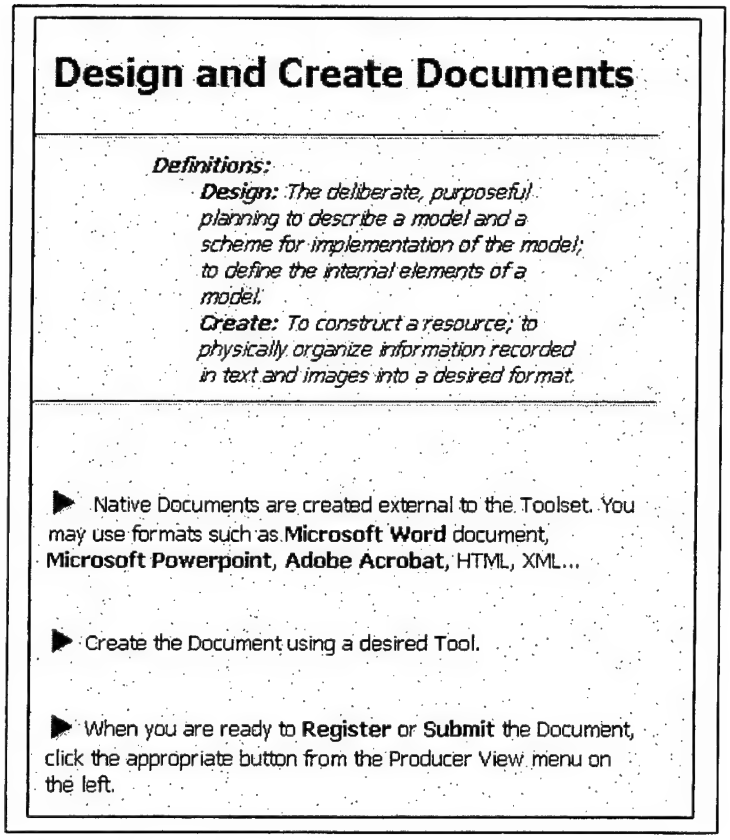

Figure 3. Design and Create Documents Screen.

2. Register

The Register New Product(s) function constitutes Producers' requests to Sponsors to load and maintain products in the FDMS. It has two sub-functions: (1) a Producer can create a registration element and (2) he can register a product.

a. Register News Products

The Register New Products screen (Figure 4) suffers from a lack of clarity. It directs the Producer to "simply upload" a product or to create a hitherto undefined "registration element." Neither of these terms are defined nor can their meanings be accurately construed from the context.

R3 The Register New Products screen will clearly inform the user of his options regarding creating registration elements or registering products.

R3.1 The screen will present the user with two options: to register a product or to create a registration element.

R3.2 The screen will briefly define "registration element" so that the user can make an informed decision.

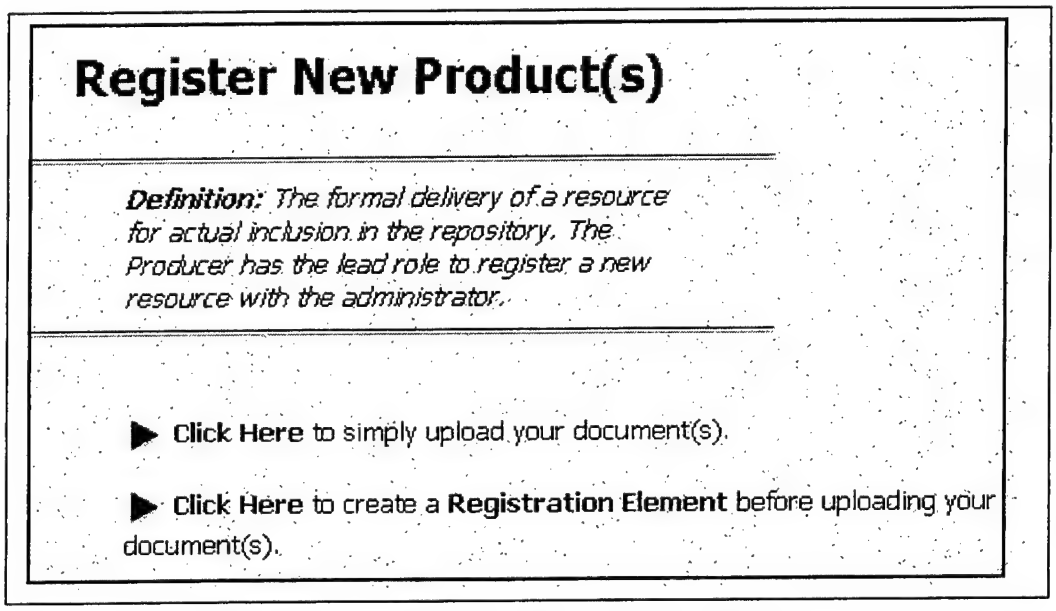

Figure 4. Register New Products Screen.

b. Create Registration Element

A registration element is analogous to a directory in the Unix and DOS operating systems: it is a device for a Producer or Sponsor to organize his modeling and simulation files. Registration elements are approved by Sponsors, and Sponsors govern what products are registered and "stored" in their registration elements.

R4 The FDMS system will control the creation of registration elements.

(1) The workflow governing the creation of a registration element is depicted in "as is" system events in the sequence diagram at Figure 5. A problem with the workflow occurs in the first step when the Producer creates a registration element. He does not *request* the creation of a registration element, but actually *creates* one on the system. The system allows the Producer to create his registration element as a sub-element of a Sponsor's existing registration element or under the Administrator's root registration element. A Producer can immediately start registering his products under the new registration element before the governing Sponsor approves it. Clearly, a Producer should not be able to use a registration element before it has been approved by the Sponsor.

R4.1 The Producer will not be able to use a registration element and it will not be visible to users other than the Administrator until it is approved by the governing Sponsor.

(2) A second problem with the workflow is that the Sponsor is not automatically informed when a Producer creates a registration element. Similarly, the Producer is not automatically informed when a Sponsor approves or disapproves a registration element the Producer created. This lack of notification burdens both the Sponsor and the Producer to manually check the registration status of the elements and products they oversee or are interested in.

R4.2 The FDMS system will overtly notify the governing Sponsor and Producer during the various steps in creating a registration element as depicted in the sequence diagram at Fig 5.

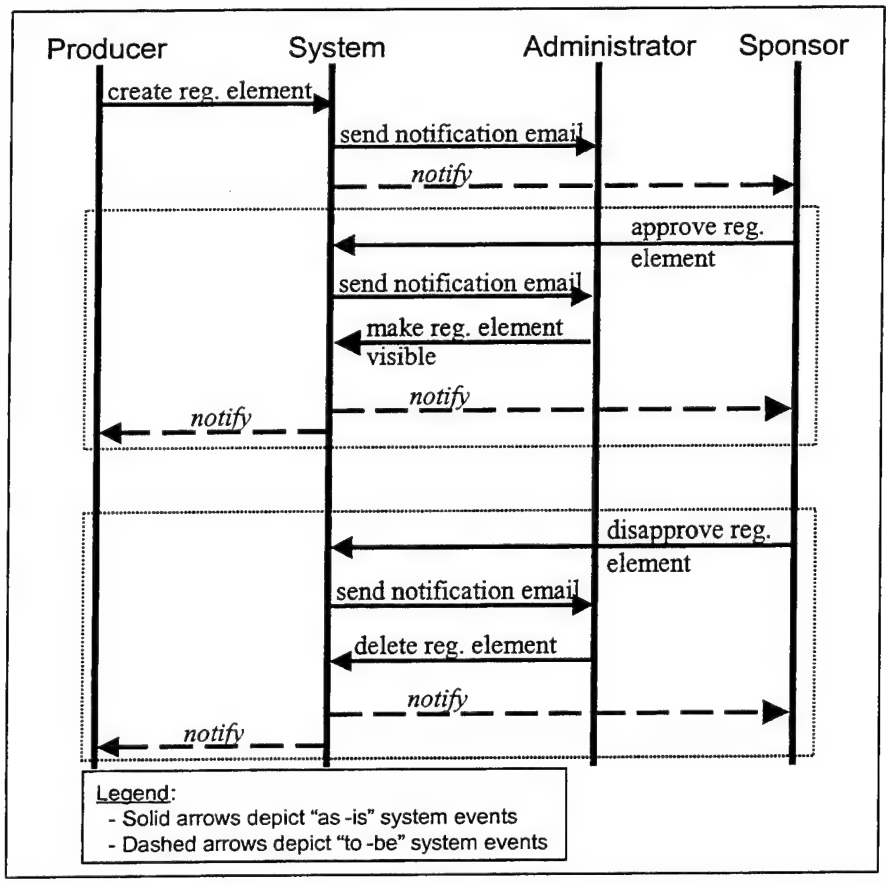

Figure 5. Registration Element Creation Sequence Diagram.

(3) A Producer can create a registration element by completing the screen at Figure 6. The screen has some cosmetic errors in it, to wit:

- The header, Register Product(s), and definition are incorrect. This screen is not used to register a product but instead is used to create a registration element.

- The term "Registration Element" is underlined suggesting that it is a hot-link to another page. It is not and, therefore, is potentially confusing to the user.

- Clicking the "Register" button in the top right corner does not complete the create-registration-element process as does the "Register" button at the bottom of the screen. It instead takes the user back to the previous Register New Products screen.

R4.3 The Create Registration Element screen will clearly inform the user how to create a registration element.

R4.3.1 The screen will have a clear header and definition.

R4.3.2 The screen will not have misleading underlining.

R4.3.3 The screen's top "Register" button will be labeled to reflect its true "go back one screen" function.

c. Register Product(s)

The process for a Producer to register a product mirrors the process to create a registration element (Figure 5) and, as such, suffers from the same deficiencies: the FDMS system fails to inform the Sponsor when a Producer submits a product for approval and the system fails to notify the Producer when the Sponsor approves or disapproves a product. As with the registration element process, this process unnecessarily burdens the Sponsor and Producer to manually check the FDMS libraries for product status.

The Register Product(s) screen is straight-forward and clear except that it shares a fault of the Create Registration Element screen -- it displays a deceptive "Register" button which takes the user back to the previous Register New Products screen.

R5 The FDMS system will control the submission of products for approval.

R5.1 The system will overtly notify the governing Sponsor and Producer during the various steps in the submission of products for approval.

R5.2 The top "Register" button on the Register Product(s) screen will be labeled to reflect its true "go back one screen" function.

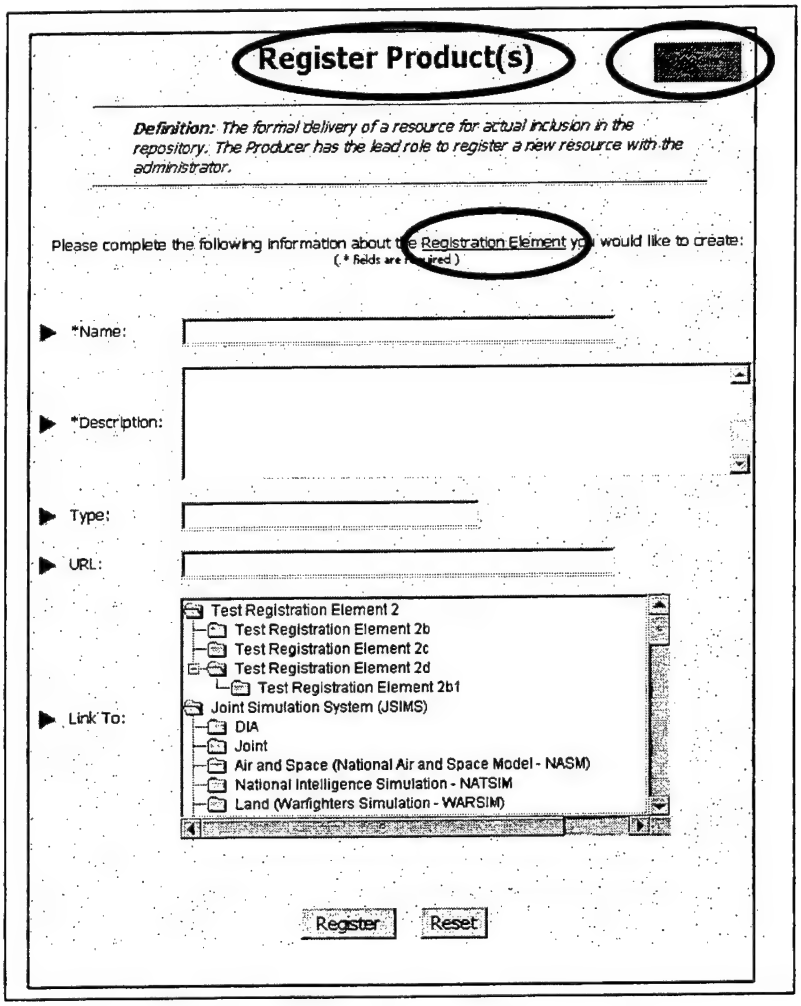

Figure 6. Create Register Element Screen.

3. Remaining Producer Functions

The remaining two of the four Producer functions are in good order. The third function, Integrate/Modify, is, like the Design/Create function, not automated. The corresponding Integrate/Modify Documents screen instructs the user to modify registered products with tools "external to the (FDMS) toolset." The instructions are clear. The title of the screen, however, should change "Documents" to "Products" as noted in Requirement R1.

The fourth Producer function, Submit, instructs the user how to re-register a product which has been modified. This function and its corresponding screen are clear.

D. SPONSOR FUNCTIONS

The Sponsor, acting as the "traffic cop" in the FDMS libraries, controls the registration and access of products. To do this the libraries provide the Sponsor with four functions as depicted in Figure 7. The functions are similar in that they entail the Sponsor selecting names of products for approval or endorsement or selecting names of users for specific permissions to view or effect the products.

Figure 7. Sponsor Functions.

1. Approve

The Product/Registration Element Approval screen (Figure 8) is functional although aspects of it are misleading. Notably, the title of the screen is incorrect -- this screen is used to approve products as well as registration elements. This error repeats itself in the table which displays "Registration Element" as the first column's header when that column lists both registration elements and products. Less serious, but still potentially puzzling to the novice Sponsor, is the second column's header, "User". In fact, the only user of the screen is one who can approve or disapprove registration elements and products; that is, a Sponsor. The column header should reflect as much.

R6 The Product/Registration Element Approval screen will be clear.

R6.1 The screen header will be correctly labeled.

R6.2 The headers of the first and second columns of the approval table will read "Product/Registration Element" and "Sponsor", respectively.

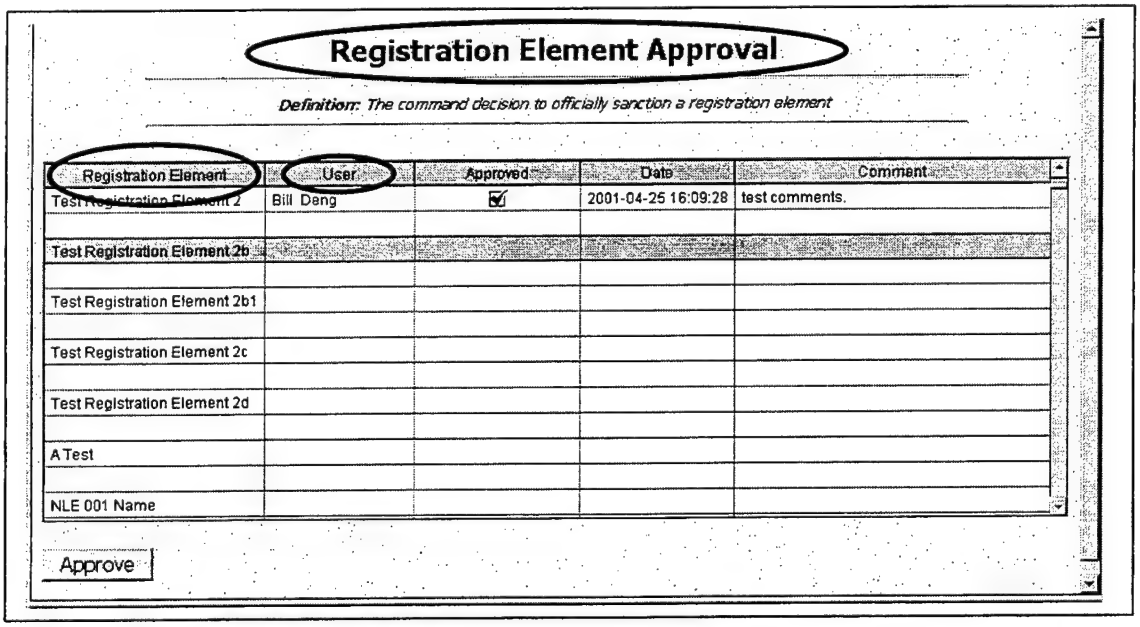

Figure 8. Product/Registration Element Approval Screen.

2. Endorse

The Product/Registration Element Endorsement screen (Figure 9) is nearly identical to the Product/Registration Element Approval screen and has similar deficiencies. The title of the screen does not reflect that registration elements are also endorsed on this screen. Additionally, two columns in the table are mis-labeled: the "User" column should be named "Sponsor" and the "Approved" column should be named "Endorsed." These changes will improve clarity and minimize confusion.

R7 The headers of the second and third columns of the approval table in the Product Endorsement screen will read "Sponsor" and "Endorsed", respectively.

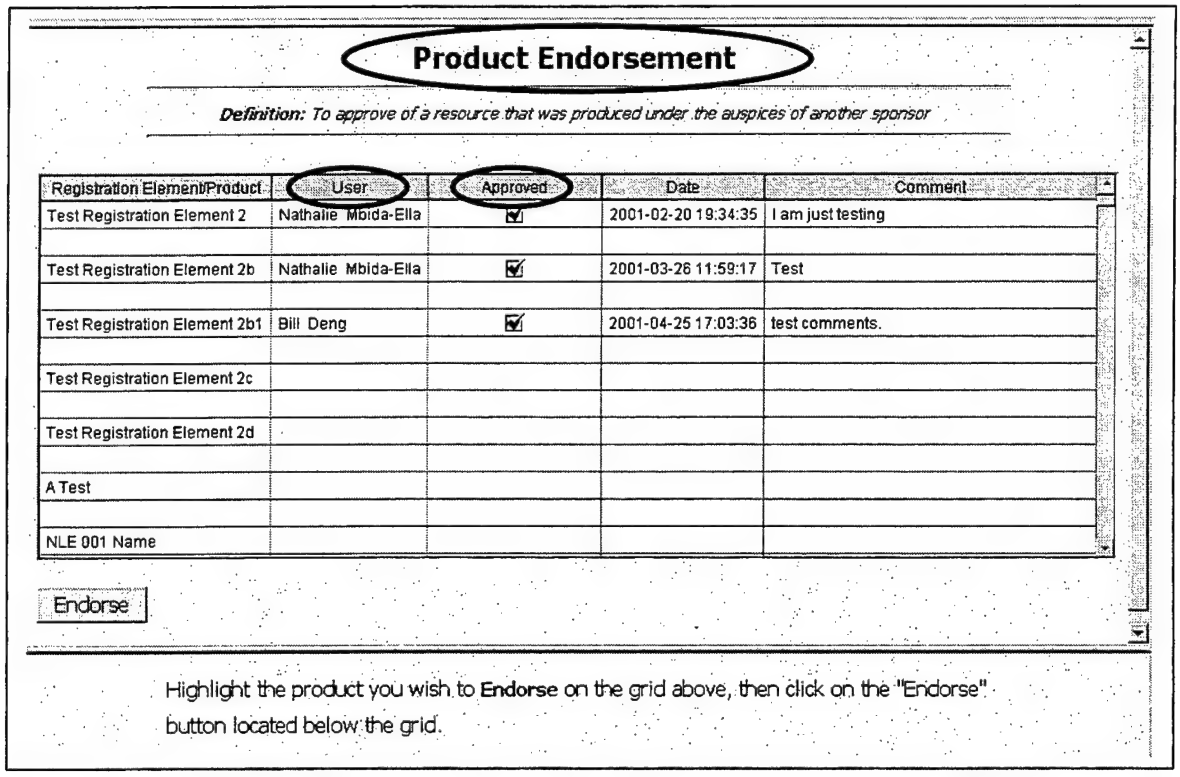

Figure 9. Product/Registration Element Endorsement Screen.

3. Allocate and Authorize Release

The Product Allocation and the Product Release Authorization functions are similar; they both allow the Sponsor to assign privileges to users regarding the use of products under the purview of the Sponsor. (There is a distinct difference between the two screens. The Product Allocation screen allows the Sponsor to assign Sponsor, Examiner, and Producer permissions to users. The Product Release Authorization screen only allows the Sponsor to provide access to a product (view or copy privileges) to a Consumer.) The screens are functional and clear (the Product Allocation screen is shown at Figure 10). A significant capability which these functions lack, however, is the ability to assign privileges to a *group* of users.

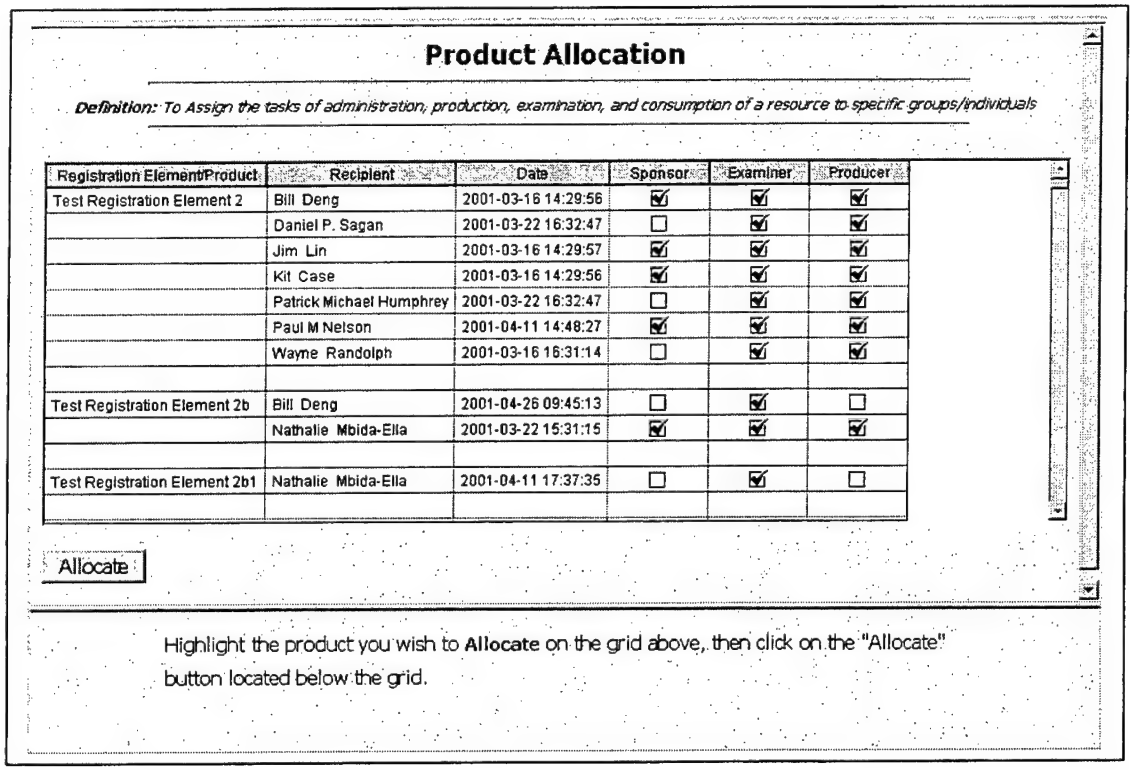

Figure 10. Product Allocation Screen.

FDMS' current capability allows the Sponsor to assign privileges to only one user at a time. This, of course, is not a burden to a Sponsor who has only a small number of users interested in his products. A Sponsor with a large team, however, will have a somewhat inconvenient chore assigning privileges, one after the other, to his team.

Consider a hypothetical example: The manager of a new Army missile program contacts the Defense Threat Reduction Agency (DTRA). He knows that DTRA has developed a computer model -- registered in FDMS -- which displays the downwind hazard of chemical agents by predicting surface winds and weather over the local terrain. The missile PM is interested in the wind predictive capabilities of the DTRA model for possible reuse in a simulation the missile PM is building to predict the accuracy of the missile. He asks the DTRA PM to allocate consumer privileges to fifty members of the missile program's team. As shown in Figure 11, the DTRA PM will have to scroll through the entire list of FDMS users and individually pick out fifty unfamiliar names. That would be quite a chore, and entirely avoidable if the missile PM was able to group his team under the name MSL_SIM, for example. Then the DTRA PM would only have to pick one name off the list, and go on with his business.

Clearly, then a Sponsor needs to be able to create groups of users and assign privileges to the those groups. This leads to the next set of requirements found on page 23:

As of this writing, the subordinate requirements of Requirement R8.1 are met in the Modeling and Simulation Resource Repository (MSRR). As discussed in the Introduction, the MSRR is a separate but related modeling and simulation library developed and managed by the Defense Modeling and Simulation Office. There is an

effort currently underway which, if successful, will allow the FDMS to use groups created and maintained in the MSRR. If that effort is unsuccessful or cannot be implemented in a timely manner, the grouping requirements will have to be implemented directly into FDMS.

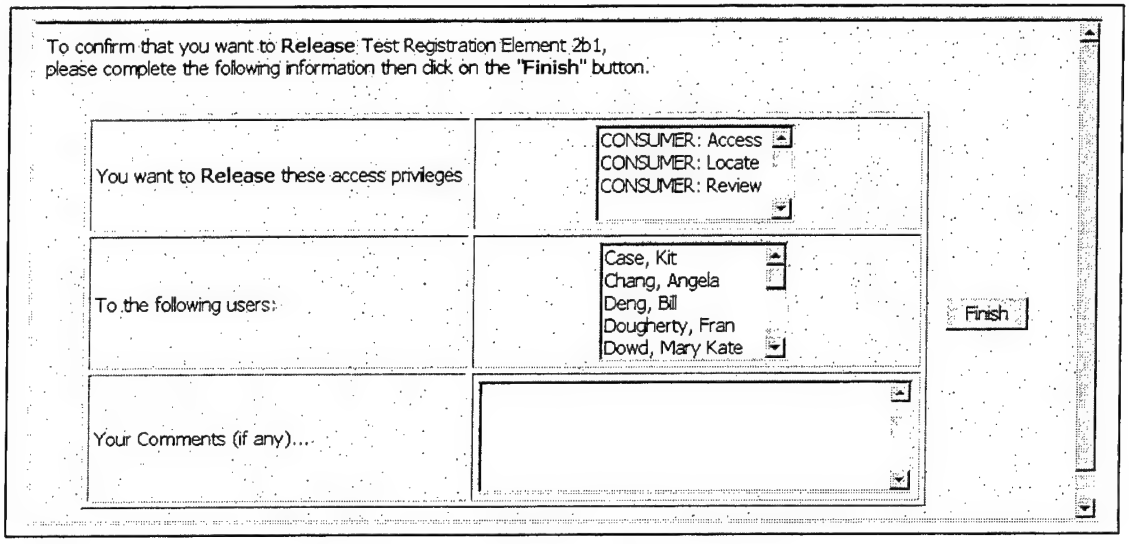

Figure 11. Product Release Screen.

R8 A Sponsor will be able to define groups and assign privileges to those groups.

R8.1 A Sponsor will be able to create and modify groups.

R8.1.1 Each group will have a unique name.

R8.1.2 The Sponsor will have the option to add notes or explanatory comments about a group.

R8.1.3 The system will display the names of users so that the Sponsor can select user names from the display to be members of his group.

R8.1.4 A Sponsor will have the option of allowing other users to use his group or of restricting all other users from using his group.

R8.1.5 A Sponsor will be able to modify a group he created. He will be able to change a group's name, update the notes about a group, add or delete members from the group, and change the restrictions governing others' use of the group.

R8.1.6 Only the original Sponsor and the Administrator will be able to modify or delete a group.

R8.2 A Sponsor will be able to assign FDMS privileges to a group in the same manner as he would to an individual user.

E. REQUIREMENTS SUMMARY

Table 3 summarizes the requirements enumerated in this chapter. The author strongly believes that the implementation of these requirements into subsequent versions of the FDMS Resource Center will significantly improve the usability of the web-based repository. This, in turn, will encourage members of the DoD modeling and simulation community to exploit the Resource Center by registering and analyzing their own products in the repository and by reusing other registered products. This anticipated synergy will directly support the first and fourth objectives of the draft DoD Modeling and Simulation Master Plan (see Table 2).

R1	The FDMS libraries will refer to the digital files in its repository as "products."
R2	The Design and Create Documents screen will clarify the difference between "register" and "submit."
R3	The Register New Products screen will clearly inform the user of his options regarding creating registration elements or registering products.
R3.1	The screen will present the user with two options: to register a product or to create a registration element
R3.2	The screen will briefly define "registration element" so that the user can make an informed decision.

Table 3 Requirements Summary (Part 1 of 3)

R4	The FDMS system will control the creation of registration elements.
R4.1	The Producer will not be able to use a registration element and it will not be visible to users other than the Administrator until it is approved by the governing Sponsor.
R4.2	The FDMS system will overtly notify the governing Sponsor and Producer during the various steps in creating a registration element as depicted in the sequence diagram at Fig 5.
R4.3	The Create Registration Element screen will clearly inform the user how to create a registration element.
R4.3.1	The screen will have a clear header and definition.
R4.3.2	The screen will not have misleading underlining.
R4.3.3	The screen's top "Register" button will be labeled to reflect its true "go back one screen" function.
R5	The FDMS system will control the submission of products for approval.
R5.1	The system will overtly notify the governing Sponsor and Producer during the various steps in the submission of products for approval
R5.2	The top "Register" button on the Register Product(s) screen will be labeled to reflect its true "go back one screen" function.
R6	The Product/Registration Element Approval screen will be clear.
R6.1	The screen header will be correctly labeled.
R6.2	The headers of the first and second columns of the approval table will read "Product/Registration Element" and "Sponsor", respectively.

Table 3 Requirements Summary (Part 2 of 3)

R7	The headers of the second and third columns of the approval table in the Product Endorsement screen will read "Sponsor" and "Endorsed", respectively.
R8	A Sponsor will be able to define groups and assign privileges to those groups.
R8.1	A Sponsor will be able to create and modify groups.
R8.1.1	Each group will have a unique name.
R8.1.2	The Sponsor will have the option to add notes or explanatory comments about a group.
R8.1.3	The system will display the names of users so that the Sponsor can select user names from the display to be members of his group.
R8.1.4	A Sponsor will have the option of allowing other users to use his group or of restricting all other users from using his group.
R8.1.5	A Sponsor will be able to modify a group he created. He will be able to change a group's name, update the notes about a group, add or delete members from the group, and change the restrictions governing others' use of the group.
R8.1.6	Only the original Sponsor and the Administrator will be able to modify or delete a group.
R8.2	A Sponsor will be able to assign FDMS privileges to a group in the same manner as he would to an individual user.

Table 3 Requirements Summary (Part 3 of 3)

IV. DISCUSSION AND CONCLUSION

A. DISCUSSION

The FDMS Resource Center is not an immature product. Select organizations, such as the Army's One Semi-Automated Forces (OneSAF) project team, are beginning to use the Resource Center extensively. The OneSAF team, for example, is charged to develop a computer-generated force (CGF) which can simulate a full range of military operations at the battalion and brigade levels. The purpose of the CGF is to test ideas and concepts in the development of future force structures, doctrine, and equipment. OneSAF uses the FDMS to catalog the various models it develops or acquires, to verify and validate those models, and to convert selected models into XML products using a common data interchange format. These "common" models can then interoperate and grow to form more complex and faithful models.

Other DoD organizations can use the FDMS Resource Center as well, but as stated earlier, they are not required to use it. Encouraging the use of the Resource Center, and gaining the synergies borne of commonly-formatted, interoperable models, is largely a marketing chore which DMSO must pursue within the modeling and simulation community. But it is also a matter of providing ready access to a repository which is easy to use with intuitive and self-explanatory screens and applications. It is this second issue which this work attempts to address.

The author took the role of the requirements analyst. Over a period of six weeks of mostly full-time work he studied the operation of the Resource Center, interviewed the

functional proponent, and had numerous discussions with the project manager and the lead designer/programmer. The product of this work, and the subsequent implementation of it into the Resource Center code, will favorably impact screen design, workflow, and user security and access.

B. CONCLUSION

Defining requirements in a clear and unambiguous style is the first step in software development. Although not drafted in a formal way, the requirements listed here are based on the FDMS Resource Center and the MSRR, each of which constitutes the ultimate in formal models – an existing implementation of a software product. The requirements, therefore, are easy to understand within the context of the existing FDMS Resource Center and, the author hopes, will not be difficult to implement. Doing so should significantly improve a novice user's understanding of the organization and functionality of the FDMS Resource Center.

There is further work available to improve and broaden the functionality of the Resource Center. Of particular note is the system's email notification system referenced in Figure 5 – the messages themselves could be made more clear to the message recipients. Examiner functions, to include the analysis tools available in the Common Library, deserve additional scrutiny and optimization. Finally, a closer linkage with the MSRR may be possible and desirable to expand the pool of the Resource Center's users. Improvements and expanded functionality in these areas can only improve the potential the FDMS Resource Center holds for the DoD modeling and simulation community.

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